4.2 COMMERCIAL AND RECREATIONAL FISHERIES

This section describes commercial and recreational fisheries (including invertebrates) within the study area and presents significance criteria used to assess potential impacts of the Project on these resources.

4.2.1 Environmental Setting

Commercial and recreational fishing along the California coast utilize several gear types that target a wide variety of fish and invertebrate species. The most common gear types include trawls, trolling, and longlines (FMA 1999). Set gill nets (both gill and trammel nets) used to fish for halibut, white seabass, white croaker, and rockfish to a depth of 60 fathoms (360 feet) in ocean waters are prohibited from Point Reyes in Marin County south to Point Arguello in northern Santa Barbara County. Therefore, this fishing method is not discussed in this document. Trawling, in particular, is the type of fishing most likely to be affected by the Project. The major component of the West Coast fisheries is groundfishes, e.g., rockfishes and flatfishes, sablefish, which comprise over 45 percent of the catch. Squid (14 percent), miscellaneous species (10 percent), tuna (6 percent), crab (6 percent), shrimp (5 percent), and salmon (almost 5 percent) also contribute significantly to the fisheries. The following sections describe commercial fishing and recreational fishing along the proposed cable route and in the vicinity of the landing areas, focusing on the most productive fisheries. Information on commercial fisheries along the California coast is taken from several sources, including the California Department of Fish and Game (CDFG) commercial fisheries catch block data (1994-2003) and Trawl logbooks (trawl intensity; 1997-2003), and Starr et al. (2002) Trends in Fisheries and Fishing Resources Sea Grant publications. Recreational catch statistics are generally summarized from the Pacific States Marine Fisheries Commission (PSMFC) RecFin database located on the Internet for northern California and from the CDFG Commercial Passenger Fishing Vessel (CPFV) database.

A summary of Essential Fish Habitat (EFH) is presented in Section 4.5; the complete EFH Assessment is presented in Appendix D.1. The EFH Assessment discusses potential impacts on managed fish and invertebrate species contained in the Pacific Fishery Management Council (PFMC) fishery management plans (FMPs). These plans include Pacific Coast groundfish, Pacific salmon, and coastal pelagic species along the proposed cable route.

Sea Route

Commercial Fisheries

Commercial fishing in the offshore region occurs at water depths ranging between shore and approximately 3,000 feet (1,000 meters) (Joint Oil/Fisheries Committee 1986). The types of fisheries described below generally occur along the cable sea route.

The trawl fishery found in central California is a mobile fishery, where a trawl net is dragged behind a boat at slow speeds either in midwater (without contacting the bottom) or along the bottom (Joint Oil/Fisheries Committee 1986). The trawl net is held open by a large otter board or door on each side of the net mouth. Most of the typical trawl vessels are 40 to 80 feet long and fish over large areas, often bringing their catch to ports other than where they are registered (CDFG 2004). Bottom trawl nets skim the ocean floor in depths from 50 to 4,000 feet. In the study area, trawlers fish for a complex of groundfish species including flounder, lingcod, rockfish (including thornyheads), sablefish, and several varieties of sole. The most common species targeted by trawlers are ridgeback shrimp (*Sicyonia ingentis*), spot prawn (*Pandalus platyceros*), rockfishes (*Sebastes* spp.), flatfishes (Bothidae and Pleuronectidae) and sea cucumbers (*Parastichopus* spp.). Most trawl fishing targets species over soft bottom and low relief (less than 3.3 ft or 1 m tall) hard bottom, where gear can effectively catch target species. Areas with high relief (greater than 3.3 ft or 1 m tall) are generally not commercially targeted by trawlers because of the potential that the trawl net could become snagged on the bottom, which could result in gear loss.

The hook and line fisheries (set or long lines) found in central California target several species of rockfishes (*Sebastes* spp.; vermilion, *S. miniatus*; boccacio, *S. paucispinus*; and chilipepper, *S. goodei*), lingcod (*Ophiodon elongatus*), and cabezon (*Scorpaenichthys marmaratus*) with few seasonal restrictions (Joint Oil/Fisheries Committee 1986). The exception to this is the recent bag limit changes imposed by the CDFG for boccacio rockfish. Abundance of this species has significantly declined, causing them to be the first rockfish along the California coast to be a candidate species on the threatened and endangered species list (NMFS 1999). Currently, boccacio are classified by NOAA Fisheries as “overfished” (personal communication, M. Love 2004). Hook-and-line fisheries typically target deep-water rocky outcrops where they deploy a long line of baited hooks over the hard bottom feature. The catch is recovered a short time later. Areas with high relief are generally not commercially targeted by long liners due to the potential for gear loss.

Trap (pot) fisheries in central California target generally three species of crabs (red rock, yellow, and brown). Traps are made of wire, plastic wire, or plastic mesh boxes ranging

in size between 2 to 4 square feet and are weighted to keep the traps on the bottom. Traps are placed in nearshore areas from shore to approximately 300 feet water depth. Crab (Dungeness) season is closed between July and November (Joint Oil/Fisheries Committee 1986).

Trolling is a productive fishery throughout the study area that targets primarily salmon and albacore. A baited hook-and-line is attached to the end of a troll line that extends 100 to 300 feet behind the fishing vessel (Joint Oil/Fisheries Committee 1986). Several trolling lines can be used at one time. This type of fishing gear typically does not make contact with the bottom, so it was not considered in this analysis.

The purse seine fishery is another productive fishery in the study area. This fishery targets mainly pelagic schooling fishes such as northern anchovy (*Engraulis mordax*), Pacific sardines (*Sardinops sagax*), and chub mackerel (*Scomber japonicus*) (Joint Oil/Fisheries Committee 1986). Purse seining follows these large pelagic fishes and essentially surrounds them with the seine net. This fishery has strict bag limits/quotas and remains open only until the quotas are filled (Joint Oil/Fisheries Committee 1986). This type of fishing gear typically does not make contact with the bottom, so it was not considered in this analysis.

The catch analysis presented below considers only gear in contact with the sea bottom since potential impacts on commercial fisheries from the cable will only be to these gear types. Of the potential impacted fisheries along the cable route, trawling is considered the type most likely affected by the Project because demersal trawls are in constant contact with the bottom using a large trawl door. Other types of gear such as long lines are also in contact with the bottom but have a significantly lower potential for contacting the cable due to their methods for anchoring the gear, e.g., small anchors. However, all gear types that may contact the bottom, including hook and line were considered in this analysis.

Even though central California's fisheries are rich in cultural and economic history, many fishery resources have greatly declined over the past decade due to decreases in fish populations and to corresponding new conservation regulations to rebuild such fish stocks (Starr et al. 2002). The 1,200 commercial vessels fishing the waters of the MBNMS each year represent a 40 percent decline in the number of commercial fishing vessels in this area since the early 1980s. In contrast, even though the number of fishing vessels has declined, total catches have increased due to the industry targeting abundant pelagic species such as Pacific sardine and market squid (*Loligo opalescens*) (Starr et al. 2002).

Between 1998 to 2002, a total of 154 million pounds of fish were landed from catch blocks along the MARS cable route (Table 4.2-1).

Table 4.2-1. Total Catch (Pounds) from CDFG Commercial Catch Blocks along and in the Vicinity of the MARS Cable Route, 1998-2002

Catch Block Number	Total Pounds (million)	Percent by Trawling
507	0.00	0.00
508	14.97	0.02
509	4.84	0.01
510	0.56	0.00
511	0.09	0.03
516	1.98	0.00
517	56.11	0.00
518	12.61	0.00
519	0.15	0.00
520	8.94	0.00
525	0.01	0.00
526	53.92	2.03
527	0.11	0.00
528	0.01	0.00
529	0.00	0.00

Source: CDFG Catch Block Data.

The highest total catches were from blocks 517 and 526, just south of the cable route (Figure 4.2-1). Taking all gear types that could potentially be affected by the cable into consideration, i.e., bottom trawling, hook-and-line, traps, block 526 had the highest percentage of catch collected by trawl (2 percent). High landings in some of the other catch blocks are mainly due to large catches of pelagic fishes (sardines, anchovy, and squid). Between 1981 and 2000, fish landed in Santa Cruz, Moss Landing, and Monterey ports had average annual values of $1.3 million, $4.7 million, and $3.6 million, respectively (Starr et al 2002; Table 4.2-2). The most common species landed at all three ports are rockfishes, salmon, and squid. Other species with large landings (in terms of pounds) include Dungeness crab (*Cancer magister*), anchovy, sardines, and albacore (*Thunnus alalunga*). Additional information on catch and value for 1994-1998, as well as fishing restrictions and seasons is presented in Appendix D, Tables D.2-1 and D.2-2.

Trawl track information (trawl intensity) between 1997 and 2003 is presented in Figure 4.2-2. Areas with the highest levels of trawl intensity (176-400 tows/0.31 mile [0.5 km]),

Placeholder for Figure 4.2-1. Total Catch in CDFG Catch Blocks Along the MARS Cable Route, 1998

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Figure 4.2-2. Historical Trawl Tow Intensity Along the MARS Cable Route. (color) Tow intensity derived from CDFG Groundfish Trawl logbooks. Proposed burial along route indicated by green (buried), yellow (partial burial), and red (unburied; rocky habitat).

including near Soquel Canyon, are in soft bottom habitat where the cable will be buried. Other highly trawled areas (north of Smooth Ridge) are composed of low relief rocks and cobble where the cable will not be buried.

Table 4.2-2. Average Annual Total Landings, Average Economic Value, and Most Common Species Landed at the Three Main Ports within the MBNMS, 1981-2000

Fishing Port	Average Annual Total Landings (Millions of Pounds)	Average Annual Value (Millions of Dollars)	Most Common Species Landed
Santa Cruz	1.1	1.3	Rockfishes Chinook salmon Market squid Dungeness crab Dover Sole
Moss Landing	18.7	4.7	Pacific sardine Market squid Rockfishes Albacore Dover Sole
Monterey	19.5	3.6	Market squid Pacific sardine Northern anchovy Rockfishes Pacific mackerel

Source: Starr et al. 2002.

Due to the over fished status of several rockfish species, the Pacific Fishery Management Council (PFMC) developed a depth-based management strategy to minimize bycatch of the affected species and eventually restore depleted stocks. The PFMC established Rockfish Conservation Areas (RCAs), a corridor in the Pacific Ocean stretching from Canada to Mexico, which is closed to specific fishing activity. The RCA is closed to both limited entry permit bottom trawlers and limited entry permit fixed gear vessels. Vessels can legally transit the RCA at any time and engage in fishing activities inside that area that are not prohibited by regulation. Trawl and non-trawl rockfish closure areas in the study area are presented in Figure 4.2-3. These areas have been in effect since mid 2002 (NOAA Fisheries 2004). The result of these closures is likely a reduction in areas along the cable route in which trawling can now occur.

Landings from nearshore soft bottom habitats averaged 14.3 million lbs/yr from 1981-2000 (Starr et al. 2002). Market squid catches in these habitats were the highest, comprising 97 percent of the total landings. Other commercial catch in this habitat includes small sharks, white seabass (*Atractoscion nobilis*), white croaker

(*Genyonemus liniatus*), surfperch, halibut (*Paralichthys californicus*), and several flatfish species.

In deep rocky shelf and slope habitats, rockfishes are the principal component of commercial and recreational fisheries in the MBNMS (Starr et al. 2002). Commercial rockfish landings from these habitats averaged 8.6 million lbs/yr from 1981-2000, with semi-pelagic species such as bocaccio, chilipepper, widow rockfish (*Sebastes entomelas*), and yellowtail rockfish (*S. flavidus*) comprising 98 percent of the total commercial catch.

More than 30 species are commonly harvested on deep soft bottom shelf and slope habitats, including shrimp, prawns, rockfishes, thornyheads (*Sebastolobus* spp.), sablefish (*Anoplopoma fimbria*), and flatfishes (Starr et al. 2002). Commercial catches in these habitats within the MBNMS remained high between 1985 and 1996, but decreased in 2000, primarily due to regulation changes.

Commercial landings of species from open water habitats have increased since the 1980s, especially for Pacific sardines, whose 1999 U.S. biomass was estimated to be about 3.8 billion lbs. Total Pacific sardine landings off California and Baja California reached more than 253 million lbs during the same time. Other commonly landed pelagic species include Chinook salmon (*Oncorhynchus tshawytscha*), Pacific mackerel, and northern anchovy.

Recreational Fisheries

Recreational fishing efforts along the central California coast are primarily concentrated in nearshore areas. The northern California marine area, defined as San Luis Obispo County north to the Oregon State Border (NOAA 1999), had total estimated landings of approximately 7.8 million fish. The five most abundant fish species (in terms of numbers of individuals) caught by recreational anglers were blue rockfish (*Sebastes mystinus*; 1,064,800), black rockfish (*Sebastes melanops*; 837,700), chub (Pacific) mackerel (704,000), white croaker (602,100), and gopher rockfish (*Sebastes carnatus*; 406,800). California halibut also comprised an important part of the recreational fishery of northern California. For example, over 391,000 halibut were collected by recreational anglers between 1994 and 1998. The San Francisco region supports one of the largest recreational fisheries for rockfishes, tuna, salmon, lingcod, and halibut.

Recreational fishing in Monterey Bay is generally limited to small boats and beach fishing. Small boats target seasonally popular species over a wide range of habitats (open water, kelp beds, and rocky reefs), such as rockfishes and lingcod, as well as

New **Figure 4.2-3. Shelf Closure Areas, Including Trawl and Non-Trawl Rockfish Closure Areas (RCA) within Monterey Bay.** The proposed cable route is also presented. Basemap provided by PFMC (2005).

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page 2 for Figure 4.2-3

flatfishes (halibut) and surfperch (Table 4.2-3; Starr et al. 2002; NOAA 1992). Recreational fishing for salmon has been an important component of marine sport fisheries since the late 1800s (Starr et al. 2002). In the Monterey region, almost all salmon catch is Chinook salmon, many of which originate from the Sacramento River basin (Starr et al. 2002). Surf smelt and night smelt also are netted in the surf off sandy beaches.

Table 4.2-3. Average Annual Total Catch, Average Effort, and Primary Species Caught in Northern California for Each of the Major Sport Fishing Modes from 1980-2000

Fishing Mode	Avg. Catch (No. of Fish)	Avg. Effort (No. Trips)	Primary Species
Commercial Passenger Fishing Vessels (CPFV)	1.5 million	235,000	Rockfishes, lingcod, mackerel
Private/Rental Boat (PRB)	2.0 million	944,000	Rockfishes, croaker, sanddabs, lingcod
All Shore Fishing (Beach/Bank, Jetty/Breakwater, Pier/Dock)	2.9 million	1.3 million	Smelt, silversides, surfperch, croaker, greenlings

1990-92 data not available for all fishing modes; 1990-95 data not available for CPFV.
Source: Starr et al. 2002.

Landing Site

Commercial Fisheries

No commercial fisheries occur at the landing site.

Recreational Fisheries

Some limited hook-and-line fishing may occur on the jetty in front of the landing site, targeting a wide variety of fishes, including surfperches, mackerel, and flatfishes.

4.2.2 Regulatory Setting

Federal

In the late 1990s, laws, such as the Federal Sustainable Fisheries Act, were passed that mandate more conservative management of marine resources. In response, Federal resource managers reduced harvest rates on heavily fished species living in deep-water habitats. The Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265), as amended by the Sustainable Fisheries Act, sets forth a number of new mandates for the National Marine Fisheries Service (NMFS, now called NOAA Fisheries), eight regional fishery management councils (Councils), and other

Federal agencies to identify and protect important marine fish habitat. The Councils, with assistance from NOAA Fisheries, are required to delineate EFH for all managed species. Federal agencies which fund, permit, or conduct activities that may adversely impact EFH are required to consult with NOAA Fisheries and respond in writing to the NOAA Fisheries' recommendations. EFH is discussed in detail in Appendix D.1.

State

State resource managers such as the CDFG are responsible for limiting harvests of nearshore species. California's Marine Life Management Act and Marine Life Protection Act will likely result in more restrictive regulations that are intended to minimize the chance of overfishing, limit bycatch, preserve EFH, and in some cases rebuild depleted stocks. Commercial and recreational fishing regulations are presented in Appendix D, Tables D.2-1 and D.2-2.

4.2.3 Significance Criteria

A commercial and recreational fishing impact is considered significant if any of the following apply:

- Long-term (more than 1 year) interference of 5 percent or more to commercial or recreational fishing operators in the project area;
- Long-term (more than 1 year) exclusion from 5 percent or more of fishing areas that have historically been important to the local commercial and recreational fishing industries;
- Economic loss, as described in §15131 of the State CEQA Guidelines (14 CCR), of 5 percent or more of the catch (averaged over the preceding five-year period) over the long term (more than 1 year) to the local commercial and recreational fishing industries; or
- Short-term impacts (of the types described in each of the above criteria) to 10 percent or more of the local commercial and recreational fishing industries during one season. For example, interference with 10 percent of more of documented commercial or recreational fishing vessel operators in the project area.

4.2.4 Impact Analysis and Mitigation

In evaluating the significance of the environmental effects of a project, the focus is on physical changes to the environment. Direct economic and social changes resulting from a project are not ordinarily treated as significant effects on the environment (State CEQA Guidelines, 14 CCR §15131; NEPA Regulations 40 CFR §1502.14). However, if

a physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change should be considered significant. Thus, adverse economic or social impacts on commercial or recreational fishing caused by physical changes to the environment from cable installation, maintenance, or repair may be considered in determining whether the Project would have a significant environmental effect. In addition, potential impacts on EFH have been independently evaluated by SAIC (D. Heilprin) in Appendix D.1. This assessment concludes that no significant impacts on managed fish and invertebrate species (Pacific groundfish, Pacific salmon, and coastal pelagics) would occur from the proposed Project.

The Applicant and representatives of commercial fishermen have been in discussions about a formal agreement that would address concerns of the fishing industry regarding the installation of the cable, potential impacts on fishing revenues from potential loss of gear, and potential exclusion from areas occupied by the cable. Such agreements, commonly referenced as Fishermen's Agreements, have been incorporated into the considerations and approvals of previous commercial fiber optic cable projects and such agreements have provided a model for the aforementioned discussions.

As detailed below, no significant impacts on commercial or recreational fisheries would occur from preclusion of fishing during cable installation, operation, repair, and removal activities from the proposed Project. Some adverse impacts from potential loss of gear and revenue are discussed below.

Impact CFR-1: Preclusion of Fishing during Cable Installation

The presence of the cable installation vessel and equipment would preclude fishing within a limited area (~1 mile; ~1.6 km) for a temporary period (a few hours to several days). (Class III)

Notice would be given to fishing vessels to alert them to the cable installation, repair, and decommissioning operations to prevent contact that could damage their fishing equipment. In addition, some fishing vessels may have to navigate a clear path around the cable laying vessel outside the harbor entrance, as described in Section 4.7. However, these minor delays would be temporary and not significant. No exclusions are proposed along the cable route during normal operations, so no interference would occur between MARS research vessels and commercial or recreational fisheries. Potential interference with commercial fishing activities could occur during cable installation activities, but would be temporary (a few hours per day that would extent over several days) and localized (over a discrete area) such that effects would be less

than significant (Class III). As the cable vessel and installation activities progress, fishing activities would not be precluded along the entire cable route. Rather, only small areas would not be available for fishing while the cable plow and cable laying vessel are in the specific area.

Impact CRF-2: Effect of the Cable's Presence on Fishing (during Project Operation)

Commercial fisheries that use equipment that contacts the bottom could potentially snag unburied portions of the cable, causing damage to or loss of their fishing gear, or damage to the cable. (Class III)

As detailed in Section 2.2, otter doors during a "typical" trawl may penetrate the seafloor between 1 inch (3 cm) to 2 inches (5 cm) when fishing properly or up to 1.6 ft (0.5 m) if doors become buried or fall on their side (MBARI 2004). Therefore, trawling over buried portions of the cable could occur without damage to fishing gear or cable. As described in Section 4.5.4, cable burial (plowing) could result in the creation of "sidecast berms" that may range from several inches to nearly three feet (~1 meter) in height on both sides of the burial trench. Areas where berms are created will not preclude trawling and in most cases, the trawls could likely trawl over the berms. Where the cable is unburied, commercial fisheries that use equipment that contacts the bottom could potentially snag the cable, causing damage to or loss of their fishing gear, or damage to the cable.

For the Global West Network (CSLC 2000), a cable fault model was used to determine the potential likelihood of bottom fishing gear snagging an unburied fiber optic cable. Based on their modeling results using catch block data, the potential for a snag to occur along the 250 km Global West Network was extremely low, i.e., 1 snag in 26 years (CSLC 2000). The cable fault model employed a "cable fault rate" coefficient, expressed in faults per kilometer of cable per year, which was determined from an extensive data base compiled over a period of three decades. The most applicable portion of this database consists of the records kept for all undersea fiber optic cables deployed over the past 10 years in the Pacific Ocean, in particular, those deployed in the vicinity of the West Coast of the U.S. and Canada. Faults in fiber optic systems on the West Coast have occurred from two sources: (1) trawling on exposed (non-buried) cables in relatively deep water, and (2) manufacturing defects in the cable aggravated by deployment and/or undetected prior to installation. This model is applicable to the current Project because the habitats, cables, and potential impacts from trawling are all similar.

Even though the potential for snagging the unburied cable is not significant in "trawlable" areas (low relief cobble), commercial fishermen may choose not to fish in the vicinity of the unburied cable out of concern about potential snags and gear damage. However, trawlers may still decide to fish in areas where the cable is not buried. Gear loss could occur if fishermen snag the cable or science node during trawling.

Estimates of potential loss along the MARS cable were calculated for reductions in fish catch and associated income associated with the possibility that fishermen may elect to avoid fishing in the vicinity of the cable (Table 4.2-4). All the areas along and in the vicinity of the cable were used to calculate a worst-case scenario, including both buried and unburied areas. The calculations were based on fish catch blocks along the sea route and landing sites (including alternative sites) and pricing data from 2002 CDFG fish catch data. Fish catch block data from 2002 were used to estimate the value of commercial fish caught within a particular catch block and the subsequent economic loss to commercial fishermen from installation and/or operation of the proposed sea cable. Over the life of the Project, the potential economic nominal loss is less than $7,000 and less than $97,000 for a maximum loss, and thus not significant (Class III). These numbers were calculated as if an exclusion zone existed around the cable (buried and unburied) even though no exclusion zones are proposed for this Project. Moreover, since the Project proposes no exclusion zones around the cable, the node, or within the 2.5-mile instrument deployment radius around the node, these losses are likely overestimates of actual potential loss due to the installation and operation of the MARS cable.

Fishing revenue losses would not be greater than 5 percent over the long term (more than 1 year) to the local commercial and recreational fishing industries. In addition, short-term impacts (of the types described above) to 10 percent or more of the local commercial and recreational fishing industries during one season would not occur. Impacts from fishing revenue losses due to gear loss from a cable snag are considered adverse impacts (Class III); the implementation of a Fishermen's Agreement would provide a mechanism, e.g., to compensate fishermen for gear losses, and reduce this adverse impact even further.

Table 4.2-4. Summary of the Potential Impact on Fishing from Exposed Cable

Fish Catch Block	Area Impacted (km^2)	Area of Block (km^2)	Nominal % of Block Area Impacted	Total Catch Value ($) at Nominal Prices	Potential Revenue Loss Nominal ($)	Potential Maximum Loss ($)
507	0.06	9.7	0.62	26,169	162	2,434
508	1.03	198.8	0.52	919,050	4,779	71,686
509	0.90	210.5	0.04	412,951	165	2,478
510	0.00	273.9	0.00	270,628	0	0
511	0.00	274.7	0.00	85,389	0	0
516	0.30	51.5	0.58	145,217	842	12,634
517	0.00	275.3	0.00	714,817	0	0
518	0.04	275.3	0.01	184,508	18	277
519	0.80	275.3	0.29	169,316	491	7,365
520	0.00	275.3	0.00	12,003	0	0
525	0.00	1.9	0.00	21,467	0	0
526	0.00	141.9	0.00	4,689,523	0	0
527	0.00	275.9	0.00	457,282	0	0
528	0.00	275.9	0.00	10,833	0	0
529	0.00	275.9	0.00	8,396	0	0
Totals	**3.13**	**3091.8**	**2.06**	**8,127,549**	**6,458**	**96,873**

Source: Analysis based on CDFG 2002 fish block data and revenues.
Notes: Dollar values based on 2002 CDFG data.
Nominal impacted areas based on 200-foot wide swath centered on unburied sections of cable (100-ft each side).
Maximum impacted area based on 1,500-foot swath (after CSLC 2000), 15 times the nominal value.

Table 4.2-5. Summary of Commercial and Recreational Fisheries Impacts and Mitigation Measures

Impact	Mitigation Measures
CRF-1: The presence of the cable installation vessel and equipment would preclude fishing within a limited area (~1 mile; ~1.6 km) for a temporary period (a few hours to several days). (Class III)	None required.
CRF-2: Commercial fisheries that use equipment that contacts the bottom could potentially snag unburied portions of the cable, causing damage to or loss of their fishing gear, or damage to the cable. (Class III)	None required.

4.2.5 Cumulative Impacts

The cumulative projects include an IODP Borehole Project, Coastal Water Project, North Harbor Redevelopment Project, Moss Landing Marine Lab Ocean pier replacement, California State Parks repair and improvement projects, and SF-12 dredge disposal site. Information on these projects is presented in Table 4-1 at the beginning of Section 4. In addition, various other ongoing activities within the MBNMS can be expected to continue into the future (commercial fishing, research, and marine recreation). These past and ongoing activities contribute to baseline conditions in the MBNMS today, including current conditions for commercial and recreational fisheries described in Section 4.2.1 above

Of the projects listed in Table 4-1, the proposed borehole project is the only specific project in the proposed cable area. The proposed IODP Borehole project would involve drilling two 350 meter deep holes in the seafloor near the terminus (node) of the proposed MARS cabled observatory. If the borehole project installation and the proposed cable installation occur at the same time, there would be potential for temporary preclusion of fishing grounds during the construction period.

Details of the borehole project were not available at the time of this analysis. Due to the fact that the proposed Project will require only a few days for cable installation and will not preclude fishing during operations, its contribution to cumulative effects would not be significant and overall cumulative effects would not be significant (Class III).

4.2.6 Alternative Landings

Alternative Landing Area 1: Duke Energy Pipeline to MBARI Property

No commercial fishing occurs at this alternative landing site. Limited recreational fishing can occur, as described above. Recreational fishing at this site is limited and likely targets surfperches, mackerel, and flatfishes. Temporary exclusion from fishing along the jetty in front of the HDD rig could occur over a short period of time (days). No significant impacts on recreational fishing at this landing site would occur (Class III).

The marine vessel transportation analysis (Section 4.7) identified vessel delay impacts associated with construction in Alternative Landing Area 1. With advanced notice to commercial fishermen, as planned by the Applicant, the delay impact on commercial fishing would not be significant (Class III).

Alternative Landing Area 2: Moss Landing Marine Laboratories (MLML) Pier

No commercial fishing occurs in the vicinity of the proposed MLML Pier. In addition, since the pier will be primarily for research purposes, limited public access will be enforced. Therefore, no recreational fishing will be permitted at this landing site and, as such, no impacts would occur to recreational fisheries.

As described above for Alternative Landing Area 1, the marine vessel transportation analysis identified vessel delay impacts associated with construction in Alternative Landing Area 2. With advanced notice to commercial fishermen, as planned by the Applicant, the delay impact on commercial fishing would not be significant (Class III).

No Project/Action Alternative

No additional impacts on commercial or recreational fishing beyond existing MBARI activities would occur under this alternative. Commercial and recreational fishing would be expected to continue in the same areas, targeting the same species.